

WHAT IS CLAIMED IS:

1. An optical disc drive comprising:
 - a light source;
 - a focusing section for focusing light emitted from the light source;
 - a focus shifting section for shifting the focal point of the light by changing the position of the focusing section perpendicularly to a data storage layer of a given optical disc in accordance with a control signal;
 - a light receiving section for receiving, at multiple areas, the light reflected from the data storage layer and generating light quantity signals representing quantities of the light received at the respective areas;
 - a focus error signal generating section for generating a focus error signal based on the light quantity signals; and
 - a control section for generating the control signal in response to the focus error signal such that the focal point of the light is transferred to a focus controllable range in which a focus control is able to be performed on the data storage layer,
 - wherein the control section generates the control signal such that the focal point of the light being shifted toward the data storage layer is decelerated initially at a first acceleration and then at a second acceleration, the absolute

value of the second acceleration being smaller than that of the first acceleration.

2. The optical disc drive according to claim 1, wherein the control section generates the control signal such that the focusing section is brought away from the optical disc and that the focal point stops shifting once entered the focus controllable range.

3. The optical disc drive according to claim 1, wherein the control section generates the control signal such that the focusing section is brought toward the optical disc until the focal point of the light passes the focus controllable range and then brought away from the optical disc once the focal point has passed the focus controllable range.

4. The optical disc drive according to claim 3, wherein the control section generates the control signal such that until the focal point of the light passes the focus controllable range, the focal point being shifted is decelerated at the first acceleration and then at the second acceleration, and that once the focal point has passed the focus controllable range, the focal point stops shifting.

5. The optical disc drive according to claim 1,

wherein the control section generates the control signal such that the focal point of the light being shifted is decelerated at the first acceleration and then stops shifting once and that the focal point starts being shifted again in the same direction and then decelerated at the second acceleration.

6. The optical disc drive according to claim 2, wherein the optical disc has a plurality of data storage layers, and

wherein the control section generates the control signal such that the focal point of the light being shifted from one of the plurality of data storage layers, for which the focus control is performed, toward the data storage layer.

7. The optical disc drive according to claim 1, wherein the focus shifting section changes the position of the focusing section in response to a train of pulses applied thereto, and

wherein the control signal generated by the control section includes a first type of pulses that increases the acceleration and a second type of pulses that decreases the acceleration.

8. The optical disc drive according to claim 7, wherein the focus shifting section changes the position,

acceleration and velocity of the focusing section according to the numbers, magnitudes and durations of the first and second types of pulses applied, and

wherein the control section generates the control signal by adjusting at least one of the numbers, magnitudes and durations of the first and second types of pulses applied.

9. The optical disc drive according to claim 1, wherein the control section suspends the focus control on the data storage layer while generating the control signal.

10. The optical disc drive according to claim 9, wherein the control section starts the focus control after having transferred the focal point to the focus controllable range.

11. A method for getting the focal point of light transferred to a focus controllable range by an optical disc drive, the optical disc drive comprising: a light source; a focusing section for focusing the light emitted from the light source; a focus shifting section for shifting the focal point of the light by changing the position of the focusing section perpendicularly to a data storage layer of a given optical disc in accordance with a control signal; a light receiving section for receiving, at multiple areas, the light reflected

from the data storage layer and generating light quantity signals representing quantities of the light received at the respective areas; and a focus error signal generating section for generating a focus error signal based on the light quantity signals,

wherein the method comprises the steps of:

(a) generating a first control signal in response to the focus error signal and supplying the first control signal to the focus shifting section such that the focal point of the light being shifted toward the data storage layer is decelerated at a first acceleration; and

(b) generating a second control signal and supplying the second control signal to the focus shifting section after the step (a) such that the focal point of the light is decelerated at a second acceleration and that the absolute value of the second acceleration is smaller than that of the first acceleration.

12. A processor for use in an optical disc drive, the optical disc drive comprising: a light source; a focusing section for focusing light emitted from the light source; a focus shifting section for shifting the focal point of the light by changing the position of the focusing section perpendicularly to a data storage layer of a given optical disc in accordance with a control signal; a light receiving

section for receiving, at multiple areas, the light reflected from the data storage layer and generating light quantity signals representing quantities of the light received at the respective areas; and a focus error signal generating section for generating a focus error signal based on the light quantity signals,

wherein the processor includes:

a first shifting control section for generating a control signal in response to the focus error signal and supplying the control signal to the focus shifting section such that the focal point of the light being shifted toward the data storage layer is decelerated at a first acceleration; and

a second shifting control section for generating another control signal and supplying the control signal to the focus shifting section such that the focal point of the light is decelerated at a second acceleration and that the absolute value of the second acceleration is smaller than that of the first acceleration.

13. A computer program product for use with an optical disc drive for focus control purposes, the optical disc drive comprising: a light source; a focusing section for focusing the light emitted from the light source; a focus shifting section for shifting the focal point of the light by changing

the position of the focusing section perpendicularly to a data storage layer of a given optical disc in accordance with a control signal; a light receiving section for receiving, at multiple areas, the light reflected from the data storage layer and generating light quantity signals representing quantities of the light received at the respective areas; a focus error signal generating section for generating a focus error signal based on the light quantity signals; and a control section for generating the control signal in response to the focus error signal,

wherein the computer program product causes the optical disc drive to perform steps of:

(a) generating a first control signal in response to the focus error signal and supplying the first control signal to the focus shifting section such that the focal point of the light being shifted toward the data storage layer is decelerated at a first acceleration; and

(b) generating a second control signal and supplying the second control signal to the focus shifting section such that the focal point of the light is decelerated at a second acceleration and that the absolute value of the second acceleration is smaller than that of the first acceleration.